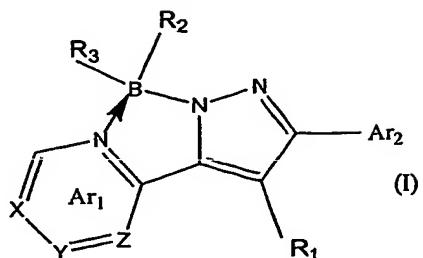


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## CLAIMS

1. A boron compound of formula



5 wherein:

$\text{Ar}_1$  represents unsubstituted or substituted monocyclic or polycyclic heteroaryl having a ring nitrogen atom for forming a coordination bond to boron as indicated and optionally one or more additional ring nitrogen atoms subject to the proviso that nitrogen atoms do not occur in adjacent positions, X and Z being carbon or nitrogen and Y being carbon or optionally nitrogen if neither of X and Z is nitrogen, said substituents if present being selected from substituted and unsubstituted hydrocarbyl, substituted and unsubstituted hydrocarbyloxy, fluorocarbon, halo, nitrile, amino alkylamino, dialkylamino or thiophenyl;

$\text{Ar}_2$  represents monocyclic or polycyclic aryl or heteroaryl optionally substituted with one or more substituents selected from substituted and unsubstituted hydrocarbyl, substituted and unsubstituted hydrocarbyloxy, fluorocarbon, halo, nitrile, amino, alkylamino, dialkylamino or thiophenyl;

$\text{R}_1$  represents hydrogen, substituted or unsubstituted hydrocarbyl, halohydrocarbyl or halo; and

20  $\text{R}_2$  and  $\text{R}_3$  each independently represent alkyl, cycloalkyl, cycloalkylalkyl, haloalkyl, halo or monocyclic or polycyclic aryl, heteroaryl, aralkyl or heteroaralkyl optionally substituted with one or more of alkyl, cycloalkyl, cycloalkylalkyl, haloalkyl, aryl, aralkyl, alkoxy, aryloxy, halo, nitrile, amino, alkylamino or dialkylamino.

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2. The compound of claim 1, wherein Ar<sub>1</sub> represents monocyclic or bicyclic heteroaryl which is unsubstituted or is substituted with one or more of C<sub>1</sub>-C<sub>4</sub> alkyl C<sub>1</sub>-C<sub>4</sub> alkoxy, trifluoromethyl or fluoro.
- 5 3. The compound of claim 2, wherein Ar<sub>1</sub> represents monocyclic or bicyclic heteroaryl which is unsubstituted or substituted pyridyl, pyrimidyl, pyrazinyl, quinolinyl, iso-quinolinyl, quinoxalinyl, or quinazolinyl..
- 10 4. The compound of any preceding claim, wherein Ar<sub>2</sub> represents monocyclic or 2-6 polycyclic aryl which is unsubstituted.
5. The compound of claim 4, wherein the monocyclic or polycyclic aryl is substituted with one or more of C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, trifluoromethyl, fluoro or nitrile.
- 15 6. The compound of claim 4 or 6, wherein the monocyclic or polycyclic aryl is phenyl, naphthyl, anthracenyl, phenanthrenyl, pyrenyl or perylenyl.
- 20 7. The compound of any preceding claim, wherein R<sub>1</sub> represents hydrogen.
8. The compound of any of claims 1-6, wherein R<sub>1</sub> represents alkyl, cycloalkyl, cycloalkylalkyl, haloalkyl, monocyclic or polycyclic aryl, heteroaryl, aralkyl or heteroaralkyl.
- 25 9. The compound of any of claims 1-6, wherein R<sub>1</sub> represents C<sub>1</sub>-C<sub>4</sub> alkyl, trifluoromethyl or fluoro.
10. The compound of any preceding claim, wherein R<sub>2</sub> and R<sub>3</sub> represent phenyl or 4-substituted phenyl.

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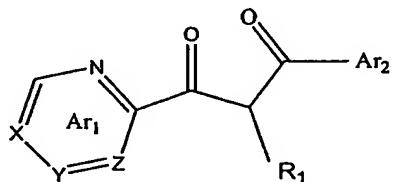
11. The compound of claim 10, wherein the substituent in the 4-position is C<sub>1</sub>-C<sub>4</sub> alkyl, trifluoromethyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or fluoro.
12. An electroluminescent device, which comprises a first electrode, a layer of an electroluminescent material as claimed in any preceding claim and a second electrode.  
5
13. The device of claim 12, wherein there is a layer of a hole transmitting material between the first electrode, which functions as the anode, and the layer of the electroluminescent material.  
10
14. The device of claim 13, wherein which the hole transmitting material is an aromatic amine complex.
15. The device of claim 13, wherein the hole transmitting material is a polyaromatic amine complex.  
15
16. The device of claim 13, wherein the hole transmitting material is a film of a polymer selected from a-NPB, poly(vinylcarbazole), N,N'-diphenyl-N,N'-bis (3-methylphenyl) -1,1' -biphenyl -4,4'-diamine (TPD), CBP, polyaniline, substituted polyanilines, polythiophenes, substituted polythiophenes, polysilanes and substituted polysilanes.  
20
17. The device of claim 13, wherein the hole transmitting material is a film of a compound of formula (II) or (III) herein or as in figures 3 to 7 of the drawings.  
25
18. The device of claim 13, wherein the hole transmitting material is a copolymer of aniline, a copolymer of aniline with o-anisidine, m-sulphanilic acid or o-aminophenol, or o-toluidine with o-aminophenol, o-ethylaniline, o-phenylene diamine or with an amino anthracene, o-toluidine, o-ethylaniline, m-toluidine, m-ethylaniline.  
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19. The device of claim 13, wherein the hole transmitting material is a conjugated polymer.
- 5    20. The device of claim 19, wherein the conjugated polymer is selected from poly (p-phenylenevinylene)-PPV and copolymers including PPV, poly(2,5 dialkoxyphenylene vinylene), poly (2-methoxy-5-(2-methoxypentyloxy-1,4-phenylene vinylene), poly(2-methoxypentyloxy)-1,4-phenylenevinylene), poly(2-methoxy-5-(2-dodecyloxy-1,4-phenylenevinylene) and other poly(2,5 dialkoxyphenylenevinylenes) with at least one of the alkoxy groups being a long chain solubilising alkoxy group, polyfluorenes and oligofluorenes, polyphenylenes and oligophenylenes, polyanthracenes and oligo anthracenes, ploythiophenes and oligothiophenes and substituted polyfluorenes.
- 10    21. The device of any of claims 12-20, wherein the electroluminescent compound is in admixture with the hole transmitting material.
22. The device of any of claims 12-21, wherein there is a layer of an electron transmitting material between the second electrode, which functions as the cathode, and the layer of the electroluminescent material.
- 20    23. The device of claim 22, wherein the electron transmitting material is a metal quinolate.
- 25    24. The device of claim 23, wherein the metal quinolate is an aluminium quinolate or lithium quinolate.

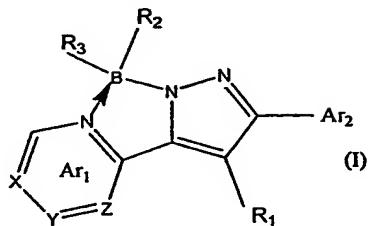
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25. The device of claim 22, wherein the electron transmitting material is of formula  $Mx(DBM)_n$  where  $Mx$  is a metal and DBM is dibenzoyl methane and  $n$  is the valency of  $Mx$  or there is a Schiff base in place of the DBM.
- 5 26. The device of claim 22, wherein the electron transmitting material is a cyano anthracene, 9,10 dicyano anthracene, a polystyrene sulphonate or a compound of formulae shown in figure 1 or 2 of the drawings.
- 10 27. The device of any of claims 22-26, wherein the electron transmitting material is mixed with the electroluminescent compound.
28. The device of any of claims 12-27, wherein the first electrode is a transparent electricity conducting glass electrode.
- 15 29. The device of any of claims 12-28, wherein the second electrode is selected from aluminium, barium, rare earth metals, transition metals, calcium, lithium, magnesium and alloys thereof and silver/magnesium alloys.
- 20 30. The device of any of claims 12-29, wherein the second electrode is selected from a metal having a metal fluoride layer formed on it.
31. The device of claim 30, wherein the metal fluoride is a lithium fluoride or rare earth fluoride.
- 25 32. A process for manufacturing a compound of the formula (I) as defined in claim 1, which comprises condensing a diketone of the formula:



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with hydrazine to give a pyrazole of the formula

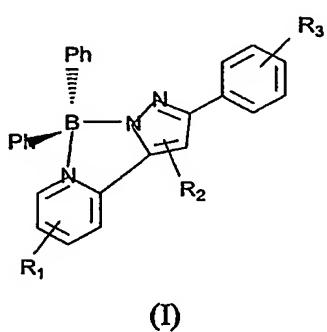


and esterifying the above pyrazole with a borinic acid of the formula  $R_2R_3BOH$  or an anhydride of formula  $R_2R_3BOBR_3R_2$  thereof to give the compound of formula (I),  
5 atoms X, Y and Z, the rings  $Ar_1$ ,  $Ar_2$  and the substituents  $R_1$ - $R_3$  having the same meanings as in claim 1.

33. The process of claim 32, further comprising the step of making the diketone of claim 32 by condensing in the presence of a base an ester of the an unsubstituted or  
10 substituted monocyclic or polycyclic heteroarylcarboxylic acid with a monocyclic or polycyclic aryl- or heteroaryl-ethanone.

34. The process of claim 32 or 33, which comprises esterifying the pyrazole with dimethylborinic acid, dimethylborinic anhydride, diethylborinic acid, diethylborinic  
15 anhydride, dicyclohexylborinic acid, dicyclohexylborinic anhydride, diphenylborinic acid, diphenylborinic anhydride, di-p-tolylborinic acid, bis(pentafluorophenyl)borinic acid or its anhydride.

35. A boron complex of formula  
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where

5 Ph is an unsubstituted or substituted phenyl group where the substituents can be the same or different and are selected from hydrogen, and substituted and unsubstituted hydrocarbyl groups such as substituted and unsubstituted aliphatic groups, substituted and unsubstituted aromatic, heterocyclic and polycyclic ring structures, fluorocarbons such as trifluoromethyl groups, halogens such as fluorine or thiophenyl groups; and

10 R, R<sub>1</sub> and R<sub>2</sub> can be hydrogen or substituted or unsubstituted hydrocarbyl groups, such as substituted and unsubstituted aromatic, heterocyclic and polycyclic ring structures, fluorine, fluorocarbons such as trifluoromethyl groups, halogens such as fluorine or thiophenyl groups or nitrile.

15 36. A complex as claimed in claim 35, in which R and/or R<sub>1</sub> and/or R<sub>2</sub> are aliphatic, aromatic or heterocyclic alkoxy, aryloxy and carboxy groups, substituted and substituted phenyl, fluorophenyl, biphenyl, phenanthrene, anthracene, naphthyl and fluorene groups alkyl groups such as t-butyl, heterocyclic groups such as carbazole.